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Correlation between Ground Level Ultra-Violet Radiation & Lower Atmospheric Aerosol Load

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UV radiation is known to affect many biological and chemical processes, and is largely detrimental to individual organisms. Specific concerns include increases in the incidence of skin cancer, ocular damage, and other health effects in humans and animals; damage to terrestrial and oceanic vegetation; changes in the chemistry of the lower atmosphere e.g. photochemical smog formation.

Factors Affecting Ground Level UV-Radiation (220-380 nm)

Ozone Column
- Stratospheric
- Tropospheric

Zenith Angle
- Latitude
- Day Number
- Solar Time

Weather Parameters
- Cloud Cover
- Relative Humidity

Atmospheric Pollutants
- Aerosols
- Sulfur di-oxide

UV-A (320-380 nm)
- Not absorbed by ozone layer

UV-B (280-320 nm)
- Partially absorbed by ozone layer
- Biologically Active

UV-C (220-280 nm)
- Absorbed by ozone layer

Health Effects

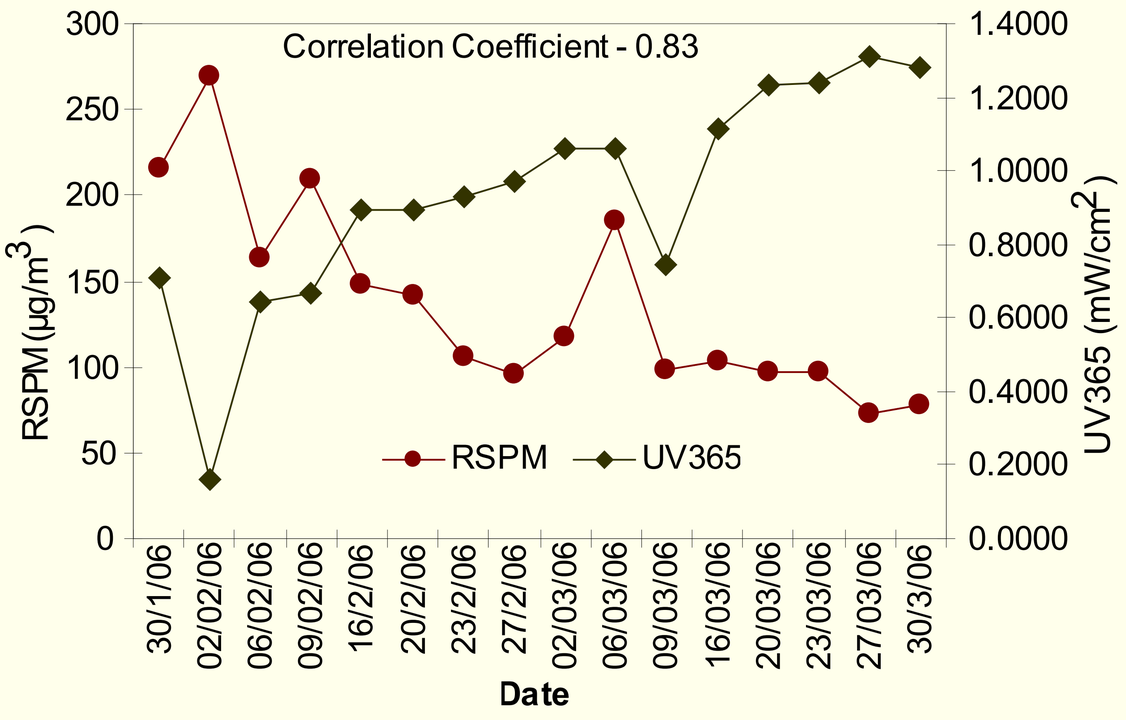
Skin Cancer (Melanoma & Non-melanoma)

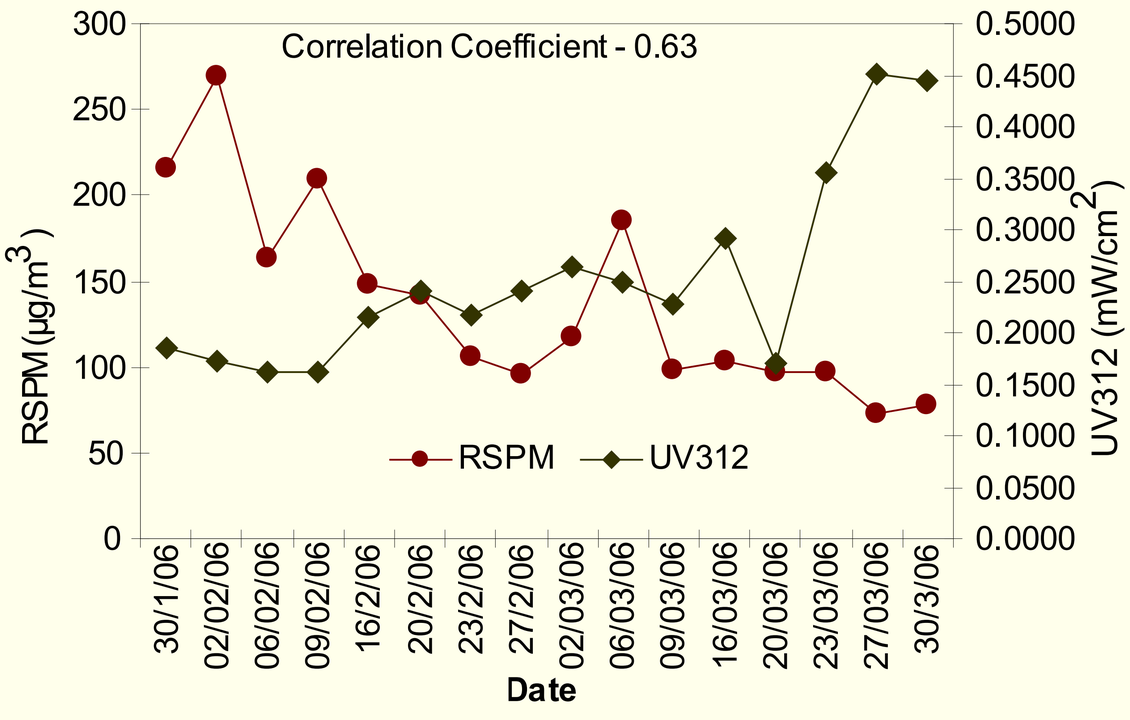
Premature aging of skin and other skin problems

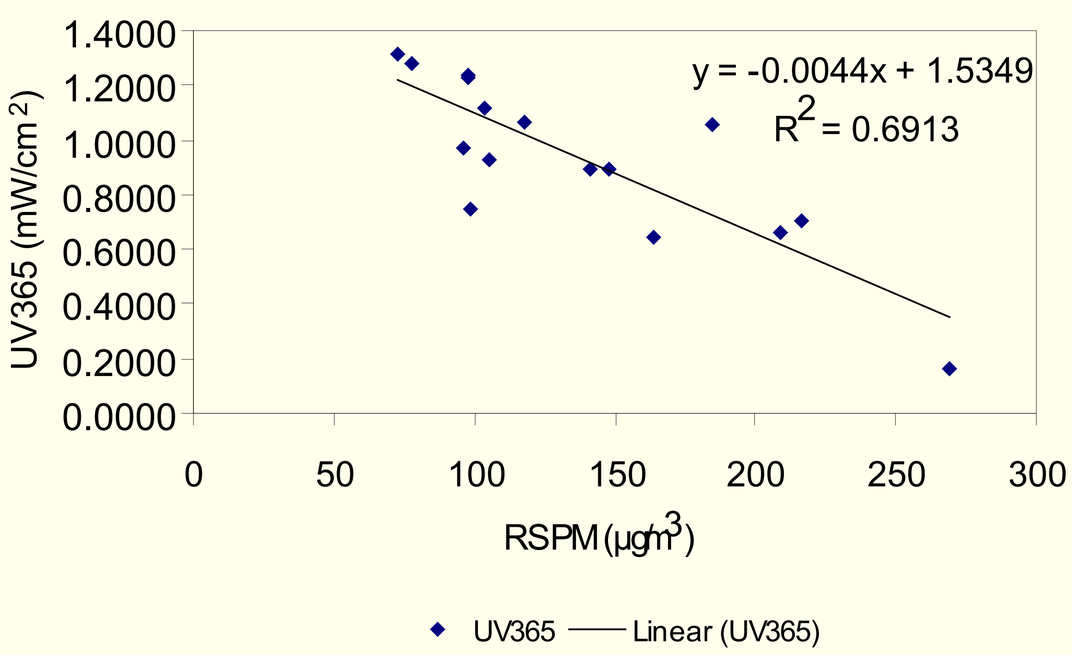
Cataracts and other eye damage

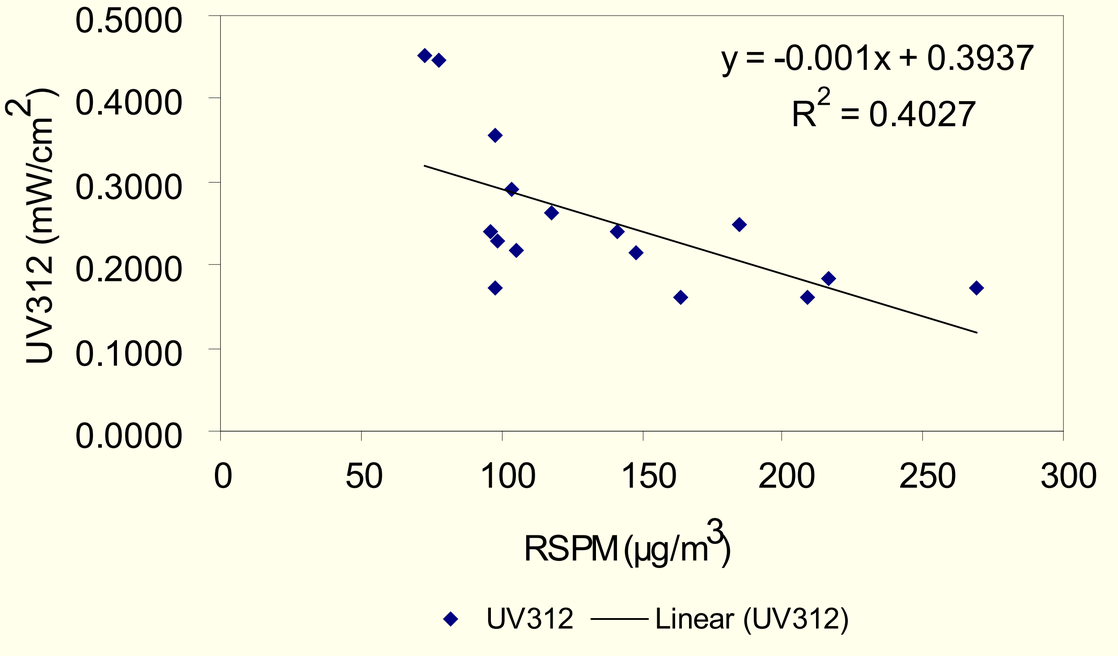
Immune system suppression

Present study was undertaken to monitor lower atmospheric aerosol load with Respirable Dust Sampler and ultraviolet radiation with UV-radiometer in the ambient environment of Delhi. PM10 and SPM (> 10 µm) samples collected for the period of the study (8 week, 2 samples per week, 16 samples). Hourly UV Fluxes (UV-B & UV-A) were measured from four hours ahead to four hours following the solar noon (LAT 12:00hrs) alongside aerosol sampling twice in a week.

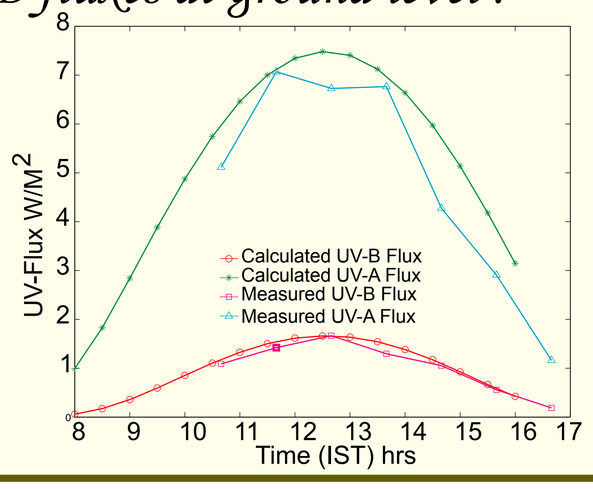








Our study shows, lower atmospheric load of finer particles (PM10) significantly cut-off both UV-A and UV-B fluxes reaching the earth surface. RSPM (PM10) load shows a satisfactory negative correlation with UV-A and UV-B fluxes at ground level .



In addition to above, we have also calculated Ground Level Solar UV-A & UV-B flux using Schippnick & Green's (1982) model with Total Ozone Column and Surface Albedo as input parameters.
We found a good agreement between calculated UV-A & UV-B fluxes with measured UV-A & UV-B fluxes.